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Vegetation Survey of Yap, Federated States of Micronesia

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Yap State coordinators included Sam Falanruw, director of resources and development, and Lydia Loofen of the Yap Institute of Natural Science who assisted with the field work. We also thank the Yap State Division of Land Management for the use of their large stereoscope.

Cover: The Yapese have developed the art of food cultivation to a high degree. Here a path through an agroforest is lined with betel nut palms.

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INTRODUCTION

Yap is one of the four States in the Federated States of Micronesia. Knowledge of the extent and composition of its vegetation, including forest land, is needed for land-use planning. To fill this need, a formal agreement was drawn up between the High Commissioner of the U.S. Trust Territory of the Pacific Islands and two agencies of the U.S. Department of Agriculture—the Soil Conservation Service and the Forest Service—to map the vegetation of Yap. The four maps were prepared by the Forest Service in cooperation with the State Government of Yap and are intended to serve as a working tool for land-use planning and forest resource management, and to provide a basis for timber volume surveys.

This bulletin presents the vegetation maps of Yap and describes the different vegetation types, their ecological function, and uses. A breakdown of nonforest types is also provided.

GEOGRAPHY AND CLIMATE

Yap consists of four metamorphic, old volcanic high islands, and a group of about 15 corralline atolls. This bulletin applies only to the high islands, which lie at lat. 9°33′ N. and long. 138°09′ E. in the western Caroline Islands (*fig. 1*). These islands consist of Yap, Maap, Rumung, and Gagil-Tamil, which lie within a broad fringing reef system that is about 30 km (19 statute mi) long and about 13 km (8 statute mi) at its widest point. The Yap Islands are located about 6,991 km (4,307 statute mi) southwest of Hawaii. The combined area of the four islands is 100.4 km^2 (39 mi^2) and the highest point is 174 m (571 ft) (Nicholson 1969).

The climate of Yap is characterized by high temperatures, heavy rainfall, and high humidity. Mean annual rainfall for 1949 to 1980 was 3,028 mm (119 in). The driest months of the year are February to April, with an average of less than 180 mm (7 in) precipitation each month. On Yap, the wettest season of the year is July through October, when the average monthly rainfall is 330 mm (13 in). Mean annual temperature is 27 °C (81 °F), with a monthly variation of only 2 °C (3 °F) between the warmest and coolest months. The difference between the daytime maximum and nighttime minimum temperatures averages 7 °C (12 °F). Mean relative humidity ranges from 79 to 85 percent.

The vegetation of Yap has been much modified by man; other than mangroves, little native forest is left. Several factors have contributed to the great amount of disturbance to the native vegetation on Yap. Circa 1850, Yap's population was estimated to be five to six times as large as the 1980 census figure of 8,000 (Hunt and others 1954, Underwood 1969). While no definite figure is available on precontact populations, legends tell of the great number of people on Yap during this period (Hunt and others 1954). The pressure on natural resources to produce food for so many people must have been intense. This factor, combined with later Japanese agricultural practices, droughts, and

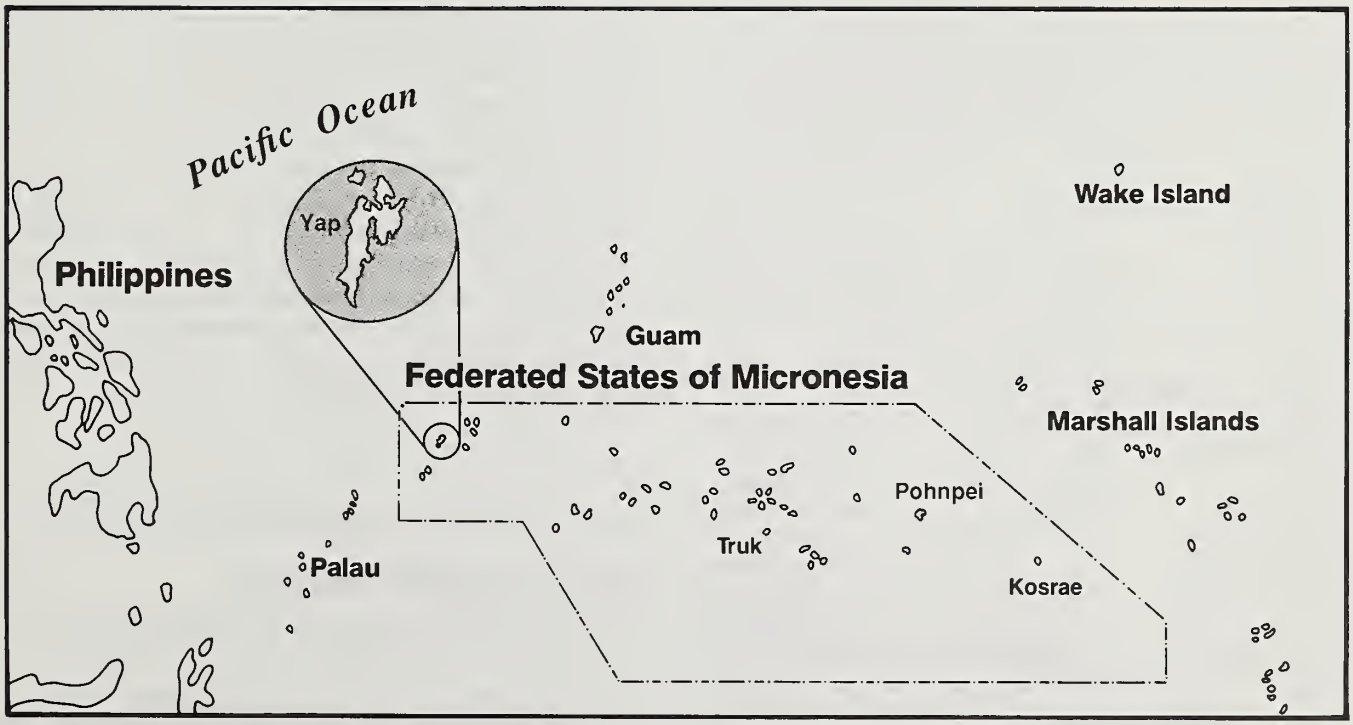

Figure 1—The state of Yap, Federated States of Micronesia, is located in the Western Caroline Islands, almost 7,00 km (4,300 mi) southwest of Hawaii.

repeated burning, has contributed to the destruction of the native vegetation, and the development or expansion of some savanna areas of degraded soils.

Throughout the years Yapese have developed food production systems that are now the best developed and most diverse among the high islands of Micronesia. These "agroforests" make up an estimated 26 percent of the vegetation of Yap (*table 1, fig. 2*).

Subsistence farming and copra production are the main agricultural enterprises on Yap. The main subsistence crops are taro, breadfruit, yams, coconuts, bananas, *Inocarpus*, and citrus. The local economy is also supported by fishing, handicrafts, tourism, and government employment. Soil scientists of the Soil Conservation Service have mapped and described 16 soil series and variants on Yap and provided guidelines for farmers, land managers, developers, and others (Smith 1983).

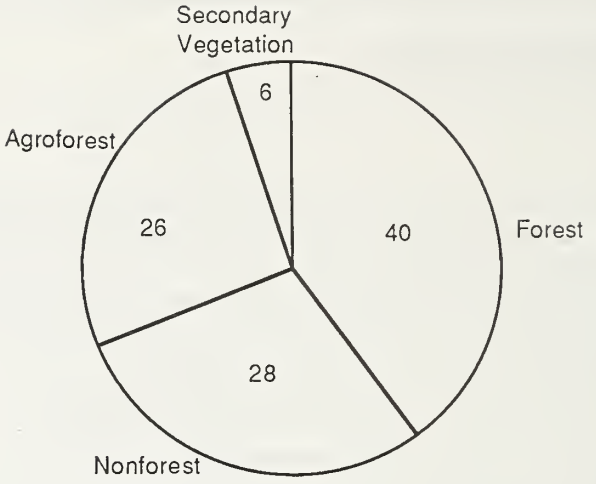

Figure 2—Four major land classes were found on Yap, Federated States of Micronesia, 1976. Although the forest class encompasses 40 percent of the land area, about half of this area is disturbed and contains inclusions of secondary vegetation.

SURVEY METHODS

Yap's vegetation types were identified and delineated on black-and-white photographs taken in 1976 at a scale of 1:10,000. Since then, some changes have occurred. Except for the area of the new airstrip, however, updating the photography to account for these recent changes was not possible.

Table 1—*Area of Yap, by land class and type, 1976*

Land class and type	Symbol	Area	
		Hectares	*Acres*
Forest			
Upland forest	UP	2,556	6,316
Swamp forest	SW	155	383
Mangrove forest	MN	1,171	2,894
Total forest		3,882	9,593
Secondary Vegetation	SV	553	1,366
Agroforest			
Agroforest	AG	1,515	3,744
Agroforest (>20 pct coconut)	AG.CO	864	2,136
Coconuts	CO	159	392
Total agroforest		2,538	6,272
Nonforest			
Marsh, freshwater	M.F	165	407
Marsh, saline	M.S	6	15
Grassland/savanna	G	2,175	5,374
Cropland	C	46	115
Urban	U	244	602
Urban with agriculture	U/C, U/AG, U/AG.CO	61	150
Barren	B	8	21
Water	W	38	95
Total nonforest		2,743	6,779
Total area		9,716	24,010

Vegetation differences can often be recognized by examining photographs stereoscopically for differences in tone, texture, and image patterns. In some cases, individual plants may be recognized by their distinctive shape. Thus, after comparing photoimagery with ground conditions in the field, a skilled interpreter becomes fairly proficient at recognizing vegetative types on aerial photos. Overall accuracy depends on the scale, age, and quality of the photographs; skill of the interpreter; degree to which the types differ in image characteristics; and the amount of checking done on the ground by the interpreter.

Before vegetation typing could begin, a vegetation mapping scheme was needed. Because much of the island is inaccessible by road and funds were limited, vegetation types were restricted to those that could be recognized on the photos without intensive ground checking. In addition, type characteristics were limited to those useful to foresters and land-use planners.

After preliminary field reconnaissance, the classification scheme presented in this bulletin was adopted. Types were delineated on the photos after stereoscopic examination and ground checking along roads and trails. Then the photos were edited and sent to the Engineering Geometronics Section of the Forest Service's Pacific Southwest Regional Office, for transfer to base maps and measurement of type areas (*tables 1 and 2, figs. 2 and 3*).

TYPE CLASSIFICATIONS

For mapping purposes, the islands of Yap were divided into four broad land classes—forest, secondary vegetation, agroforest and nonforest. Saltwater bays and other bodies of water are

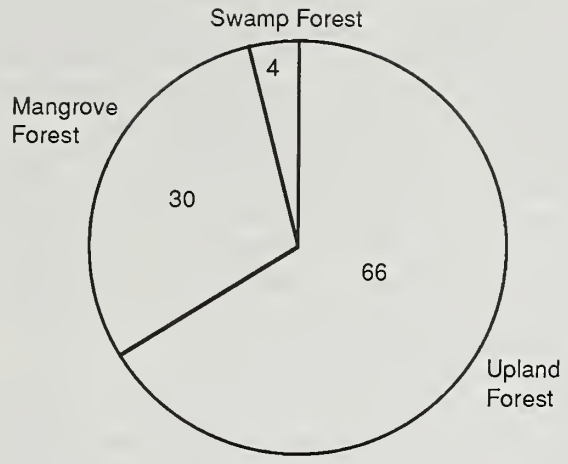

Figure 3—The forest land class was broken down into three types on Yap, Federated States of Micronesia, 1976. Both the swamp and upland forest types are heavily disturbed for agricultural purposes and contain much secondary vegetation.

listed under the nonforest class. Primary types under the major land classes include:

Forest—The forest class includes three types:
Upland forest (UP)
Swamp forest (SW)
Mangrove forest (MN)

Secondary vegetation (SV)—Secondary vegetation includes vines, shrubs, and small trees on recently disturbed areas.

Agroforest (AG)—The agroforest class is made of areas under cultivation for food crops, fruit, wood, and other products.

Nonforest—Nonforest areas include grasslands, marshes, degraded sites, and areas developed for urban use. Primary types in this class are:
Marsh (M)
Savanna grasslands (G)
Cropland (C)
Urban (U)
Barren (B)
Water (W)

The forest types are further subdivided into size and density classes (*table 2*), identified by these codes:

Code	Size class
0	Short, shrub-like stands smaller than 12.5 cm (5 in) in diameter at breast height (d.b.h.).
1	Trees averaging less than 30 cm (12 in) in d.b.h. but larger than or equal to 12.5 cm (5 in) in d.b.h.
2	Trees averaging 30 or more cm (>12 in) in d.b.h.

Code	Density class
H	High—crown closure of main canopy over 70 percent.
M	Medium—crown closure of main canopy between 30 and 70 percent.
L	Low—crown closure of main canopy less than 30 percent.

On the folded maps, vegetative areas are numbered and identified by symbols in the legend. In each code, the vegetation type is shown first, followed by the size and crown density class. For example, MN1H would indicate mangrove less than 30 cm (12 in) but at least 12 cm (5 in) in d.b.h. and a high density crown closure. Where possible, dominant species are identified. In such cases, the density class is followed by a period, then by one or two letters of the genus name, MN1H.S, as when *Sonneratia alba* makes up at least 20 percent of the mangrove stand. Occasionally, mixed stands are identified by a slash between the primary vegetation type and a second type, with density and size classes given only for the primary type. For example, UP2L/SV.H would indicate scattered upland trees, 30 cm (12 in) or greater in d.b.h., with inclusions or patches of secondary vegetation having *Hibiscus tiliaceus* as its major component (*table 3*).

VEGETATION TYPE DESCRIPTIONS

Land classes and primary types are described by habitat and major overstory and understory species listed below. Full species citations and families of plants mentioned in the text are given in *table 4*.

Forest

Upland Forest (UP)

The forests of Yap have been greatly modified from their original condition. Many stands are a mixture of native, agroforest, secondary, and introduced species. A common component of better developed native forest is *Campnosperma brevipetiolata*

Table 2—*Area of forest land, by size class and density, on Yap, 1976*

Type	Size class[1]	Density class[2]			Total
		Low	Medium	High	
		Hectares (acres)			
Upland forest	0	85	95	29	209 (516)
Upland forest	1	295	1,198	60	1,553 (3,837)
Upland forest	2	90	696	8	794 (1,962)
Swamp forest	1	3	111	0	114 (283)
Swamp forest	2	0	41	0	41 (102)
Mangrove forest	0	0	0	26	26 (64)
Mangrove forest	1	16	143	944	1,103 (2,725)
Mangrove forest	2	0	7	35	42 (104)
Total forest					3,882 (9,593)

[1]0—Short, shrub-like stands smaller than 12.5 cm (5 in) in d.b.h.
1—Trees averaging less than 30 cm (12 in) in d.b.h. but larger than or equal to 12.5 cm (5 in) in d.b.h.
2—Trees averaging 30 or more cm (>12 in) in d.b.h.

[2]Crown closure of main canopy: low, less than 30 pct, medium, 30–70 pct; high, greater than 70 pct.

Table 3—*Vegetation type codes used for Yap, Federated States of Micronesia*

Land class	Vegetation codes	Vegetation types, subtypes, and components
Forest	UP	Upland forest, size and density classes apply
	UP/SV	Secondary vegetation inclusions
	UP/SV.BB	Bamboo inclusions
	UP.AG	Agroforest component
	SW	Swamp forest, size and density classes apply
	SW/SV	Secondary vegetation inclusions
	SW/SV.H	Hibiscus inclusions
	SW/SV.BB	Bamboo inclusions
	SW.AG	Agroforest component
	MN	Mangrove forest, size and density classes apply
	MN.N	*Nypa* palm component
	MN.S	*Sonneratia* component
Secondary vegetation	SV	Secondary vegetation
	SV.BB	Bamboo component
	SV.H	Hibiscus component
	SV.P	Pandanus component
Agroforest	AG	Agroforest
	AG/SW	Swamp forest inclusions
	AG/SV	Secondary vegetation inclusions
	AG/SV.BB	Bamboo inclusions
	AG.CO	Coconut component
	CO	Coconut plantation, size and density classes apply
Nonforest	M.F	Freshwater marsh
	M.F.C	Freshwater cultivated marsh
	M.S	Saline marsh
	G	Savanna grassland
	G.B	Barren component
	G.CA	Abandoned cultivation
	G.D	Disturbed lands
	G.F	Fern component
	G.G	Grass component
	G.P	Pandanus component
	G.W	Wetlands component
	C	Open cultivation
	U	Urban
	U/AG	Agroforest inclusions
	U/AG.CO	Coconut inclusions
	U/B	Barren inclusions
	U/C	Cropland inclusions
	U/SV	Secondary vegetation inclusions
	W	Water, including fresh, saline, and bays

NOTES:

Size classes and density codes are used only with the forest class and with the coconut plantation type.

Various combinations of components are used, especially within the savanna grassland type, as for G.B.F.P meaning Grassland with barren, fern, and pandanus components.

All components, inclusions, or understory species must be present on at least 20 percent of the mapped area.

(Hosokawa 1954). In association with *Campnosperma* are usually found the poison tree, *Semecarpus venenosus*, *Buchanania engleriana*, *Inocarpus fagifer*, *Pterocarpus indicus*, *Pentaphalangium volkensii*, and occasionally, *Garcinia rumiyo*. In some areas, large *Serianthes kanehirae* var. *yapensis*, *Ficus prolixa*, and *Calophyllum inophyllum* occur. Characteristic species of the understory in better developed forests include *Barringtonia racemosa* (especially in wet situations), *Timonius albus*, *Ixora casei*, *Psychotria* spp., *Meryta senfftiana*, and *Pandanus japensis*. Lianas are characteristically *Raphidophora* spp.

Several phases of more scrubby forest occur on Yap. Species characteristic of forests occurring in better drained areas such as the summits of Mt. Tabiwol and Mt. Madade, include *Diospyros ferrea*, *Psychotria* spp., *Aidia cochinchinensis*, *Ixora triantha*, *Timonius albus*, *Glochidion* spp., *Desmodium heterocarpum*, and occasionally *Garcinia rumiyo*. *Cycas circinalis* is sometimes found in the understory.

A characteristic type of low elevation native forest is found growing in savanna areas, usually in steep ravines. The most common tree species of these forests are *Trichospermum ikutai*, *Commersonia bartramia*, *Campnosperma brevipetiolata*, *Rhus taitensis*, and *Calophyllum inophyllum*. Species common to both the edges of these ravine forests and adjacent grassland areas include *Pandanus tectorius*, *Commersonia bartramia*, *Alphitonia carolinensis*, *Pouteria obovata*, and stunted individuals of *Trichospermum ikutai*.

Trees commonly found in coastal areas include *Terminalia catappa*, *Guettarda speciosa*, *Calophyllum inophyllum*, *Hernandia sonora*, *Vitex negundo*, and occasionally, *Pemphis acidula*, *Barringtonia asiatica*, and *Tournefortia argentea*. These species are characteristic of atoll forest. On Yap, however, they do not occur in areas large enough to delineate and are generally included with other categories.

Introduced species of trees characteristic of inhabited areas include *Adenanthera pavonina*, *Albizia lebbeck*, *A. retusa*, *A. falcataria*, *Cassia* spp., *Tectona grandis*, and *Swietenia mahagoni*. A stand of *Melaleuca quinquenervia* exists, and scattered *Swietenia mahagoni* occur in a number of native forest areas where it has naturalized.

Most of Yap is privately owned and utilized, at least intermittently, for agricultural production. This results in a characteristic patchwork pattern of forest, agroforest, and secondary vegetation—the fallow stage of Yapese gardening. Of the 2,556 ha (6,316 acres) mapped as upland forest, 1,271 ha (3,141 acres) or 50 percent had inclusions of secondary vegetation, coded UP/SV, or upland forest with agroforest, coded UP/AG (*table 3*).

Swamp Forest (SW)

Swamp forest occurs where soils are inundated with fresh or slightly saline water. The most common habitat for such forests are low wet areas just inland of mangroves, above tidal influences but lower in elevation than the surrounding terrain. Other sites exist inland where water collects in low areas along rivers, and in areas of impeded drainage. Occasionally, the distinction between swamp and other forest is not clear due to the poorly drained and waterlogged nature of Yap's soil.

The vegetation survey had departed from Hosokawa (1952) and Stemmerman and Proby (1978) by not recognizing "hibiscus swamp" as a separate forest type. Though *Hibiscus tiliaceus* often grows in swampy places, it is not confined to such habitat and is a common component of secondary vegetation.

Table 4—*Plant species mentioned in text*[1]

Genus	Species and author	Family
Acrostichum	aureum L.	Pteridaceae
Adenanthera	pavonina L.	Mimosaceae
Aidia	cochinchinensis Lour.	Rubiaceae
Albizia	falcataria (L.) Fosb.	Mimosaceae
Albizia	lebbeck (L.) Benth.	Mimosaceae
Albizia	retusa Benth.	Mimosaceae
Alphitonia	carolinensis Hosok.	Rhamnaceae
Annona	muricata L.	Annonaceae
Areca	cathecu L.	Palmae
Artocarpus	altilis L.	Moraceae
Artocarpus	heterophyllus Lam.	Moraceae
Averrhoa	bilimbi L.	Oxalidaceae
Averrhoa	carambola L.	Oxalidaceae
Bambusa	spp.	Gramineae
Bambusa	vulgaris Schrad. ex Wendl.	Gramineae
Barringtonia	asiatica (L.) Kurz	Lecythidaceae
Barringtonia	racemosa (L.) Spreng.	Lecythidaceae
Bruguiera	gymnorhiza (L.) Lam.	Rhizophoraceae
Buchanania	engleriana Volk.	Anacreardiaceae
Calophyllum	inophyllum L.	Guttiferae
Campnosperma	brevipetiolata Volk.	Anacreardiaceae
Carica	papaya L.	Caricacreeae
Cassia	spp.	Caesalpinaceae
Cassytha	filiformis L.	Lauraceae
Casuarina	litorea L.	Casuarinaceae
Cayratia	spp.	Vitaceae
Cerbera	manghas L.	Apocynaceae
Ceriops	tagal (Perr.) C.B.Rob	Rhizophoraceae
Citrus	aurantifolia (Christm.) Swingle	Rutaceae
Citrus	aurantium L.	Rutaceae
Citrus	grandis (L.) Osbeck	Rutaceae
Citrus	hystrix DC.	Rutaceae
Citrus	macroptera Montr.	Rutaceae
Citrus	mitis Blanco	Rutaceae
Citrus	reticulata Blanco	Rutaceae
Citrus	sinensis (L.) Osbeck	Rutaceae
Cocos	nucifera L.	Palmae
Colocasia	esculenta (L.) Schott	Araceae
Commersonia	bartramia (L.) Merr.	Sterculiaceae
Crateva	speciosa Volk.	Capparidaceae
Crotalaria	spp.	Papilionatae
Cycas	circinalis L.	Cycadaceae
Cynometra	ramiflora L.	Caesalpinaceae
Cyperus	javanicus Houtt.	Cyperaceae
Cyrtosperma	chamissonis (Schott) Merr.	Araceae
Dalbergia	candenatensis (Dennst.) Prain	Fabaceae
Decaspermum	fruticosum Forst.	Myrtaceae
Derris	elliptica (Roxb.) Benth.	Fabaceae
Derris	trifoliata Lour.	Fabaceae
Desmodium	heterocarpum (L.) DC.	Fabaceae
Dioscorea	spp.	Dioscoreacea
Diospyros	ferrea (Willd.) Bakh.	Ebenaceae
Dolicandrone	spathacea (L.F.) K. Shum.	Bignoniaceae
Eleocharis	spp.	Cyperaceae
Eugenia	spp.	Myrtaceae
Eupatorium	odoratum L.	Compositae
Excoecaria	agallocha L.	Eupohorbiaceae
Ficus	prolixa var. carolinensis (Warb.) Fosb.	Moraceae
Ficus	tinctoria Forst. F.	Moraceae
Fimbristylis	spp.	Cyperaceae
Garcinia	rumiyo Kaneh.	Guttiferae
Gleichenia	linearis (Burm.F.) Clarke	Gleicheniaceae
Glochidion	spp.	Euphorbiaceae
Guettarda	speciosa L.	Rubiaceae
Hanguana	malayana (Jack) Merr.	Flagellariaceae
Hedyotis	spp.	Rubiaceae
Heritiera	littoralis Dry.	Sterculiaceae
Hernandia	sonora L.	Hernandiaceae
Hibiscus	tiliaceus L.	Malvaceae
Hyptis	capitata Jacq.	Verbinaceae
Inocarpus	fagifer (Park.) Fosb.	Fabaceae
Ipomoea	aquatica Forsk.	Convolvulaceae
Ipomoea	spp.	Convolvulaceae
Ischaemum	spp.	Gramineae
Ixora	casei Hance	Rubiaceae
Ixora	triantha Volk.	Rubiaceae
Lantana	camara L.	Verbenaceae
Leucaena	leucocephala (Lam.) de Wit	Mimosaceae
Ludwigia	hyssopifolia (G.Don) Exell	Onagraceae
Ludwigia	octovalvis (Jacq.) Raven	Onagraceae
Lumnitzera	littorea (Jack.) Voigt	Combretaceae
Lycopodium	cernuum L.	Lycopodiaceae
Macaranga	carolinensis Volk.	Euphorbiaceae
Mangifera	indica L.	Anacardiaceae
Melaleuca	quinquenervia (Cav.) Blake	Myrtaceae
Melastoma	malabathricum L.	Melastomataceae
Melochia	spp.	Sterculiaceae
Merremia	spp.	Convolvulaceae
Meryta	senfftiana Volk.	Araliaceae
Mimosa	invisa Mart	Leguminosae
Mimosa	pudica L.	Leguminosae
Morinda	citrifolia L.	Rubiaceae
Musa	paradisiaca L.	Musaceae
Musa	sapientum L.	Musaceae
Musa	textilis Nees.	Musaceae
Musa	troglodytarum L.	Musaceae
Myrtella	bennigseniana (Volk.) Diels	Myrtaceae
Nepenthes	mirabilis (Lour.) Druce	Nepenthaceae
Nypa	fruticans Wurmb.	Palmae
Pandanus	japensis Mart.	Pandanaceae
Pandanus	tectorius Park.	Pandanaceae
Pangium	edule Reinw. ex Bl.	Flacourtiaceae
Paspalum	distichum L.	Gramineae
Passiflora	foetida var. hispida (DC.) Killip	Passifloraceae
Pemphis	acidula Forst.	Lythraceae
Pennisetum	spp.	Gramineae
Pentaphalangium	volkensii Lauterb.	Guttiferae
Phragmites	karka (Retz.) Trin. ex Steud.	Gramineae
Pongamia	pinnata (L.) Merr.	Fabaceae
Pouteria	obovata (R.Br.) Baehni	Sapotaceae
Premna	obtusifolia R.Br.	Verbinaceae
Psidium	guajava L.	Myrtaceae
Psychotria	spp.	Rubiaceae
Pterocarpus	indicus Willd.	Fabaceae
Raphidophora	spp.	Araceae
Rhizophora	apiculata Bl.	Rhizophoraceae
Rhizophora	mucronata Lam.	Rhizophoraceae
Rhus	taitensis Guill.	Anacardiaceae
Scaevola	taccada (Gaertn.) Roxb.	Goodeniaceae
Schypiphora	hydrophyllacea Gaertn.	Rubiaceae
Semecarpus	venenosus Volk.	Anacardiaceae
Serianthes	kanehirae var. yapensis Fosb.	Mimosaceae
Sonneratia	alba J.E. Smith	Sonneratiaceae
Stachytarpheta	spp.	Verbenaceae
Swietenia	mahagoni (L.) Jacq.	Meliaceae
Tacca	leontopetaloides (L.) O. Ktze.	Tacrecaceae
Tectona	grandis L.F.	Verbenaceae
Terminalia	catappa L.	Combretaceae
Timonius	albus Volk.	Rubiaceae
Tournefortia	argentea L.F.	Boraginaceae

continued

Table 4—*Plant species mentioned in text (continued)*

Genus	Species and author	Family
Trema	spp.	Ulmaceae
Trichospermum	ikutai Kaneh.	Tiliaceae
Vigna	marina (Burm.) Merr.	Fabaceae
Vitex	negundo var. bicolor (Willd.) Lam	Verbinaceae
Wedelia	triloba (L.) Hitchc.	Compositae
Wollastonia	biflora (L.) DC.	Compositae
Xylocarpus	granatum Koen.	Meliaceae

[1]Scientific names of dicotyledonae, monocotyledonae, and palmae follow Fosberg and others (1979), Fosberg (1960) and Moore and Fosberg (1956) respectively.

Many areas which probably once supported swamp forest on Yap have been converted into taro patch systems. Swamp forests are now limited in area and are poorly developed and heavily disturbed. Species characteristic of swamp forest habitat just inland of mangroves include *Dolicandrone spathacea*, *Heritiera littoralis*, *Pongamia pinnata*, *Cynometra ramiflora*, *Dalbergia candenatensis*, *Derris trifoliata*, and *Acrostichum aureum*. A few almost pure stands of *Dolichandrone spathacea* can be found, and *Barringtonia racemosa* is common in wetter areas. The most common situation found, however, is swamp forest mixed with secondary vegetation or agroforest with taro patches. In fact, 85 percent of the total swamp forest area contain secondary vegetation or agroforest inclusions.

Swamp forest species growing along rivers do not generally cover areas extensive enough to be separately mapped and are generally included in the upland forest class. Woody species characteristic of these riverine areas and in wet inland depressions include *Barringtonia racemosa*, *Hibiscus tiliaceus*, *Semecarpus venenosus*, *Inocarpus fagifer*, *Ficus tinctoria*, *Pandanus japensis*, *Cerbera manghas*, *Ixora casei*, and *Derris elliptica*.

Mangrove Forest (MN)

The most distinctive vegetation type on Yap is mangrove. These forests have specialized roots inundated at least periodically by sea water. Mangroves are found around most of Yap's coast, and are especially well developed on mud flats at the mouths of drainage systems. They serve as a natural filtering and nutrient buffering system between the island and lagoon, settling silt and providing for a slow sustained release of nutrients. Mangroves also serve as fish nurseries and habitat for birds and fruit bats, and provide house posts, craftwood, firewood, and fishing and gathering grounds.

The mangrove type is distinct on aerial photos due to its dark tone and smooth texture. The inland margins of mangroves, however, are sometimes hard to separate from the adjacent vegetation. The most common size class of mangroves on Yap are stands of medium stature (MN1). Another type of mangrove consists of areas of low tangled growth generally found where water circulation is limited and the soil more firm. These almost impenetrable stands consist of *Rhizophora* trees and occasionally *Bruguiera gymnorhiza*. These areas are coded MNOH (*table 3*).

Species composition of mangroves varies by habitat. *Nypa fruticans* is generally found in the more brackish areas, in stands generally too narrow to map. Where *Nypa* palm makes up at least 20 percent of the stand, the area is typed as MN1M.N or MN1H.N.

Where other mangrove species can be recognized on photographs and make up at least 20 percent of the stand, they are indicated by type symbols. *Sonneratia alba* is often taller and has a less dense canopy and is coded MN1H.S. *Bruguiera gymnorhiza* and *Xylocarpus granatum* tend to grow along the landward edge of mangroves. However, they do not generally present a distinct canopy texture for consistent identification. *Lumnitzera littorea* also grows along the landward edge of mangrove areas, but usually does not occur in pure stands and, therefore, is not generally typed. *Schypiphora hydrophyllacea*, *Ceriops tagal*, and *Excoecaria agallocha* are other mangrove species which are not distinguished on the vegetation maps.

Secondary Vegetation

This vegetation class is somewhat intermediate between forest and nonforest. Secondary vegetated areas are generally covered with fast-growing weedy species. Quite often, these areas of secondary vegetation represent Yapese garden sites in the fallow phase. Due to the slash and burn agriculture and bulldozing, much of the native forest is now mixed with secondary vegetation. Of the total land area of 9,716 ha (24,010 acres) mapped on Yap, it was found that 2,799 ha (6,917 acres) or 29 percent are mixed with secondary vegetation. Besides the 553 ha (1,366 acres) in the secondary vegetation class, this figure includes SV inclusions in the agroforest, forest, swamp forest, and urban types.

On aerial photos, secondary vegetation is characterized by a low uneven canopy, usually of medium density. The type is readily identified by its hazy texture, especially when vines are present. Tall stands of bamboo which appear as plumes and are easily identified, are typed as SV.BB. Characteristic species, many introduced, of the secondary vegetation type on Yap include *Macaranga carolinensis*, *Hibiscus tiliaceus*, *Rhus taitensis*, *Melochia* spp., *Ishaemum* spp., *Morinda citrifolia*, *Glochidion* spp., *Trema* spp., *Commersonia bartramia*, *Cayratia* spp., *Merremia* spp., *Ipomoea* spp., *Bambusa* spp., *Passiflora foetida* var. *hispida*, *Mimosa invisa*, *M. pudica*, *Crotalaria* spp., *Cassia* spp., *Lantana camara*, *Premna obtusifolia*, *Hyptis capitata*, *Pennisetum* spp., and *Stachytarpheta* spp., and occasionally *Casuarina litorea*. Recently introduced and spreading are *Eupatorium odoratum* and *Wedelia triloba*, and *Leucaena leucocephala* especially in areas of corral rock.

Species characteristic of atoll forest and strand vegetation that occur along the sandy coasts of Yap are sometimes included in the secondary vegetation type when they occur in strips too narrow to be mapped.

Agroforest

Productive agroforests have been created by the Yapese. Fruit bats and birds also assist, by spreading seeds. Agroforests consist of a mixture of food and other useful trees found growing around villages. Scattered coconut trees and breadfruit trees are an indicator of agroforest. The canopy is often uneven, and may be interspersed with open areas of taro patches, croplands, and areas of secondary vegetation or upland forest too small to be separately mapped.

Most agroforests include coconut trees. If coconut trees make up 20 percent or more of the canopy, the area is classified as AG.CO. If the crown cover of an area is almost exclusively composed of coconut trees, it is classified as coconut plantation and coded CO.

On Yap, the agroforest class is part of a three-component system of food production which involves tree gardens, taro patches, and intermittent open gardens. The following description of this system is adapted from Falanruw 1980, 1982, and 1985. Tree species commonly found in the agroforest overstory are *Cocos nucifera*, *Artocarpus altilis*, *Areca cathecu*, *Mangifera indica*, *Inocarpus fagifer*, *Pangium edule*, *Artocarpus heterophyllus*, *Rhus taitensis*, and *Calophyllum inophyllum*. Common smaller trees include *Citrus aurantifolia*, *C. aurantium*, *C. hystrix*, *C. sinensis*, *C. mitis*, *C. reticulata*, *C. grandis*, *C. macroptera*, *Eugenia* spp., *Crateva speciosa*, *Averrhoa bilimbii*, *A. carambola*, *Musa paradisiaca*, *M. sapientum*, *M. textilis*, *M. troglodytarum*, *Annona muricata*, *Carica papaya*, and *Psidium guajava*. A wide variety of ornamental and useful shrubs are planted along paths through agroforests. Other useful shrubs and herbs grow in the understory, as do epiphytes, vines, and ground cover plants. They provide food, fuel, fiber, ornamentations, and medicines, meet other needs, and include some uncultivated species. Yap's tree gardens are relatively self-perpetuating and are tended on an intermittent basis throughout the year.

The second component of Yap's agroforest class consists of taro patches developed in low areas and often connected via water channels. Many varieties of *Cyrtosperma chamissonis* and *Colocasia esculenta* are grown. *Ipomoea aquatica* may be present in deeper areas of some of the larger taro patches.

The tree gardens and taro patches of Yap's agroforests function as a unit and are managed together. The canopy of the tree gardens protects the soil from erosion by the often torrential rainfall, and provides for the recycling of nutrients via the decomposition of leaves and debris. Ditches, often stone lined, drain the tree gardens and direct an aerated flow of water through a system of channels and taro patches, where silt and nutrients are trapped and utilized. The management of these areas involves removal of undesirable species, pruning and general care of useful trees, transfer of accumulated organic matter from fertile low areas to raised areas, and the harvesting and replanting of taro patches.

The third part of the Yapese system involves intermittent gardens of yams (*Dioscorea* spp.) and other crops. Areas of secondary vegetation or forest, found throughout agroforest areas, are usually cleared or partially cleared for such gardens. The common practice is to burn a small area during the dry season. The opening or "skylight" created is then planted to a variety of crops. With the resultant ash fertilizer and beginning rains, crops generally grow fast and form a multilayered cover over the soil by the time the heavy rains come. After several harvests, these gardens are allowed to go fallow so that the canopy reforms and soil fertility is renewed.

Nonforest

Marshes (M)

Areas of grasses, sedges, and herbs growing in standing water most of the year are classified as marshes. Graminoid marshes give a characteristic smooth texture on the aerial photos. Two types of marshes are demarcated:

- Marsh, saline (M.S)—Areas generally along the coast adjacent to mangroves, or sometimes in depressions, where there are sand or mud flats periodically inundated by salt water or with standing pools of salt or brackish water. Common herbaceous species include *Cyperus javanicus*, *Derris trifoliata* (especially at the edge of mangroves), *Eleocharis* spp., *Fimbristylis* spp., *Paspalum distichum*, *Vigna marina*, and *Wollastonia biflora*. A number of woody species characteristic of strand, swamp forest, and mangrove may surround or be sparsely scattered in such marshes.
- Marsh, freshwater (M.F)—Areas generally located slightly above sea level, often landward of mangroves; or in depressions in upland areas. The vegetation in these areas may consist of tall reeds, especially *Phragmites karka*, sedges, and other herbaceous growth often including *Ludwigia hyssopifolia*, and *L. octovalvis*, and in some areas *Hanguana malayana*. The large fern *Acrostichum aureum* is often present in marshes which are more brackish. Freshwater marshes cultivated for *Cyrtosperma chamissonis* and *Colocasia esculenta* are designated M.F.C. Many taro patches are below the minimal size for mapping or occur in areas indentified as agroforest. Our vegetation maps therefore do not reflect the actual area in taro.

Savanna Grasslands (G)

Savanna grasslands are areas of land with a layer of low herbaceous cover. Shrubs and trees, if present, are widely scattered. The soils are generally infertile poorly drained clays. Savanna grassland areas are thought to be the result of destruction of the forest vegetation, particularly by fire, loss of the humus layer, and exposure of the soil to rain and sun. Frequent fires prevent tree species from returning, and the soil becomes more and more degraded.

A number of subtypes of savanna grasslands have been demarcated and are identified by letters following the designation G:

- Bare—Areas with very poor soil, with patches of bare soil intermittent with low herbaceous growth of grasses and sedges or the fern *Gleichenia linearis* (designated G.B).
- Formerly cultivated—Grasslands which are known to have been cultivated recently or in the past, by the Yapese or the Japanese, as indicated by patterns of raised garden beds (designated

G.CA). Occasionally, elevated grave sites may be included in this type, as they give a similar pattern on the aerial photos, but they can be distinguished on the ground. The mapped incidence of abandoned agricultural areas is lower than their actual frequency due to the covering of dense grass, preventing identification.

• Disturbed—Land that bears the signs of having been disturbed by recent human activity such as bulldozing. Generally, these areas will remain degraded savanna land, due to the loss of the humus layer (designated G.D).

• Fern land—Areas where the predominant cover is a tangled growth of *Gleichenia linearis* fern, sometimes with a mix of other species including *Lycopodium cernuum*. Fires in such areas burn the vegetation completely, selecting against other species, whereas the *Gleichenia* resprouts (designated G.F).

• Grasses and sedges—A predominance of graminoid species (designated G.G).

• Pandanus—Savanna land with at least 20 percent *Pandanus tectorius* (designated G.P).

• Shrubs—Grasslands with a mix of graminoid species and shrubs. Stunted small trees such as *Trichospermum*, *Commersonia*, *Alphitonia*, and *Timonius albus* characteristic of the ravine scrub forest may occur. Also commonly found are *Decaspermum fruticosum*, *Myrtella bennigsiana*, *Melastoma malabathricum*, *Nepenthes mirabilis*, *Cassytha filiformis*, *Morinda citifolia*, *Hyptis capitata*, *Scaevola taccada*, *Hedyotis* spp., *Tacca leontopetaloides*, and *Desmodium* spp. (designated G.S).

• Wetlands—Grasslands in low areas where the soil is usually very poorly drained. Vegetation is generally low grasses and sedges although some *Pandanus* may be present (designated G.W).

Cropland (C)

Areas of cultivated lands without tree cover. They are usually large sweet potato gardens. Most Yapese open canopy gardens are below the minimal size to be typed and are included with the agroforest or secondary vegetation classes.

Urban (U)

Towns, villages, and areas developed for nonforest use. Where buildings, roads, etc. are interspersed with vegetation, the area may be classed as Urban/Secondary vegetation (U/SV), Urban/Agroforest land (U/AG), Urban/Coconuts (U/AG.CO), Urban/Cropland (U/C), or Urban/Barren (U/B).

Barren (B)

This designation is applied to disturbed areas that lack natural vegetation, because of factors such as rocks, sterile soil, and bulldozing.

Water (W)

Includes both fresh and brackish water and enclosed salt water bays.

GLOSSARY

Agroforest: An area of mixed growth including trees, cultivated for fruit, food, wood, and other products.

D.b.h.: Diameter at breast height. Tree diameter outside bark measured at breast height, 1.3 m above the ground.

Forest land: Land at least 10 percent stocked by live trees and not currently developed for nonforest use.

Land class: A classification of land by major use or major vegetative characteristics.

Nonforest land: Land that has never supported forests or was formerly forested and is currently developed for nonforest use, or degraded.

Secondary vegetation: A vegetative type characterized by small fast-growing trees, which grow in disturbed areas. Vines are often present.

Vegetative types: Areas delineated on the maps as having similar plant composition to one of the types described in the section on type classification.

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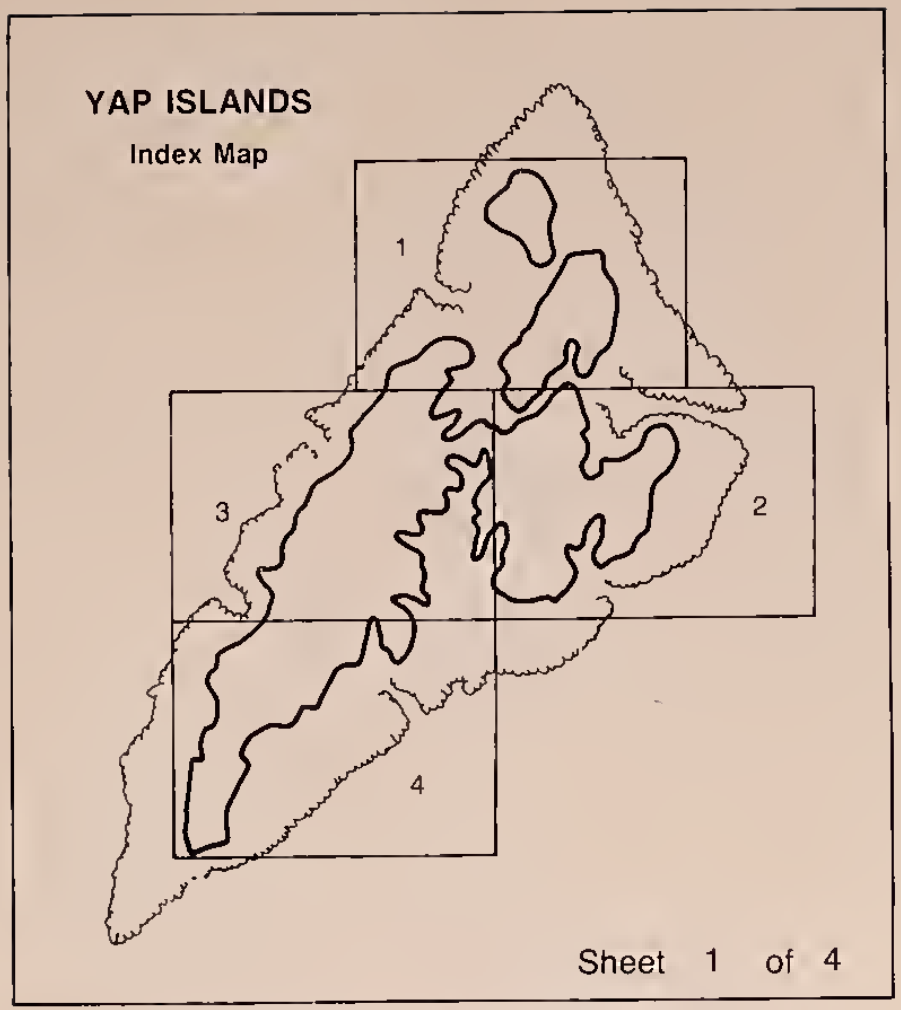

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VEGETATION LEGEND

For explanation of vegetation type codes see Table 3

ITEM	LABEL	AREA (ACRES)	AREA (HECTARES)
5	SV.BB	30	12.1
6	G.CA.G	4	1.6
7	AG.CO	20	8.1
8	AG/SV.BB	7	2.8
9	SV.BB	7	2.8
10	W	1	.4
12	G.CA.G	7	2.8
13	M.F	1	.4
14	G.CA.G	4	1.6
15	MN1H	8	3.2
16	W	1	.4
18	AG.CO	184	74.5
19	AG/SV.BB	261	105.6
20	G.G	1	.4
21	G.G	1	.4
23	C	9	3.6
24	G.CA.B.F.P	25	10.1
25	G.F.P	12	4.9
27	G.CA	25	10.1
28	G.CA.F.P	55	22.3
29	AG.CO	3	1.2
30	MN1H	87	35.2
31	AG	29	11.7
32	AG	41	16.6
33	G.CA	4	1.6
34	G.CA	20	8.1
35	AG/SV.BB	59	23.9
36	G.F.P	65	26.3
39	MN1H	7	2.8
40	AG/SV	92	37.2
43	AG/SV	2	.8
44	C	7	2.8
45	MN1H	26	10.5
46	AG/SV.BB	115	46.5
47	M.F	3	1.2
48	CO1H	42	17.0
50	SW1M	19	7.7
51	C	2	.8
52	UP1H	3	1.2
54	C	1	.4
56	C	17	6.9
57	AG	11	4.5
58	G.CA.F.P	43	17.4
59	G.CA	6	2.4
60	M.F.C	1	.4
61	AG.CO	8	3.2
63	C	3	1.2
64	AG	57	23.1
65	AG/SV	27	10.9
66	M.F	4	1.6
67	UP0L	6	2.4
68	MN1H	9	3.6
69	AG	7	2.8
71	M.F	1	.4
72	G.CA	27	10.9
73	G.CA.F	9	3.6
74	C	1	.4
77	M.F	1	.4
78	G.G.P	93	37.6
80	UP1M/SV	83	33.6
81	M.F	1	.4
82	UP1M	26	10.5
85	G.F	8	3.2
86	G.G.S	3	1.2
87	G.F.S	2	.8
89	AG.CO	1	.4
91	CO1H	26	10.5
92	G.CA.F	40	16.2
93	G.B	4	1.6
94	UP1M	32	12.9
95	B	2	.8
97	UP1H	7	2.8
98	G.F	6	2.4
99	G.P	7	2.8
100	AG	9	3.6
102	AG/SV.BB	362	146.5
103	AG	85	34.4
105	MN1H	2	.8
106	UP0L	6	2.4
107	SV	1	.4
108	UP1H	1	.4
109	G.CA.P	24	9.7
110	G.CA	5	2.0
111	C	5	2.0
112	SV	3	1.2
113	G.S	15	6.1
114	AG	21	8.5
115	MN1H	68	27.5
116	MN1H	7	2.8
117	SV	4	1.6
118	C	1	.4
119	C	1	.4
120	M.F.C	1	.4
121	G.G	1	.4
122	AG	24	9.7
123	MN1H.S	7	2.8
124	C	1	.4
125	AG	7	2.8
126	AG	13	5.3
127	G.P	30	12.1
128	UP1L	4	1.6
129	AG/SV	3	1.2
132	G.CA.S	3	1.2
133	SV.BB	7	2.8
134	SV.BB	42	17.0
136	G.S	1	.4
137	G.CA	25	10.1
138	MN1H	54	21.9
139	C	2	.8
141	MN0H	18	7.3
143	AG/SV	6	2.4
144	AG	2	.8
145	MN1H	20	8.1
146	M.F.C	1	.4
148	AG	5	2.0
150	W	1	.4
151	M.F	2	.8
152	AG.CO	36	14.6
153	MN1H	2	.8
154	UP1M/SV	26	10.5
155	AG/SV.BB	40	16.2
156	C	1	.4
157	MN1L	8	3.2
158	M.F	1	.4
159	UP1M/SV.BB	61	24.7
160	UP2H	5	2.0
161	AG/SV	68	27.5
162	UP1M	12	4.9
163	MN1H	2	.8
165	SV.BB	13	5.3
166	SW1M.AG	15	6.1
167	MN1L	5	2.0
168	CO1H	34	13.8
169	G.G.S	3	1.2
170	UP2M	52	21.0
171	G.G.P	13	5.3
172	SV	9	3.6
173	G.G	1	.4
174	SW1M/SV	15	6.1
175	M.F	3	1.2
176	G.CA.F.P.S	5	2.0
178	SV	5	2.0
179	UP2M/SV.BB	32	12.9
180	MN1H	6	2.4
181	G.P.S	36	14.6
182	G.CA.G.P	58	23.5
183	G.G	1	.4
184	MN1H	20	8.1
185	UP2M.AG	5	2.0
186	AG	30	12.1
187	G.CA.P	14	5.7
188	UP1M/SV.BB	37	15.0
189	SV.P	5	2.0
190	G.G	1	.4
191	UP0L	1	.4
192	AG	23	9.3
193	C	5	2.0
194	CO1H	24	9.7
195	AG/SV	53	21.4
197	G.B.F.S	57	23.1
198	C	1	.4
199	MN1H	46	18.6
200	AG/SV	4	1.6
201	SV.H	3	1.2
202	AG	27	10.9
203	SV	2	.8
204	G.S	7	2.8
205	UP1M	16	6.5
206	UP2M	3	1.2
207	G.CA.F	9	3.6
209	SW2M	3	1.2
210	MN1H	28	11.3
212	U/AG	1	.4
213	UP1L	6	2.4
214	UP2M/SV	16	6.5
215	W	2	.8
216	UP2M	11	4.5
217	G.CA.G.P.S	16	6.5
218	MN1H	10	4.0
219	AG	31	12.5
220	U/AG	3	1.2
221	UP2M/SV.BB	6	2.4
222	UP1H	6	2.4
223	G.CA.F.P	19	7.7
224	W	4	1.6
225	MN1H	1	.4
226	UP1M	21	8.5
227	SV	2	.8
228	UP1H	4	1.6
229	G.P.S	8	3.2
230	CO1H	2	.8
231	MN1H	1	.4
232	MN1H	7	2.8
233	UP1M	5	2.0
234	UP1H	8	3.2
235	MN2H	3	1.2
236	MN1H	1	.4
237	AG.CO	3	1.2
238	MN1H	3	1.2
239	CO1H	1	.4
240	SW.BB	4	1.6
241	W	3	1.2
242	MN1H	1	.4
243	UP1H	3	1.2
244	UP1L	2	.8
245	MN0H	2	.8
246	UP1M/SV	1	.4
247	SV	1	.4
248	UP1M/SV.BB	1	.4
250	UP2M/SV	1	.4
251	M.F	1	.4
252	G.G.S	1	.4
260	AG.CO	24	9.7
261	C	3	1.2
262	UP1M	58	23.5

Produced by the United States Geological Survey
in cooperation with Trust Territory of the Pacific Islands

Control by USGS and TTPI

Compiled by photogrammetric methods from aerial photographs taken 1968. Field checked 1970. Limited field check 1980
Map edited 1981

Culture and hydrography data compiled from DMA charts 81800A1197 and 81810A1193
This publication is not intended for navigational purposes
Projection and 10,000-foot ticks: Yap coordinate system
Shoreline is mapped at mean high water

Marine boundaries have not been established on this map

SCALE 1:20,000

Kilometers 0 1 2

Nautical Miles 0 1

CONTOUR INTERVAL 5 METERS
DATUM IS MEAN SEA LEVEL

Vegetation map compiled by Pacific Southwest Forest and Ranger Experiment Station and Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture. Cartography by Alan H. Ambacher, USDA - Forest Service, Pacific Southwest Region, Engineering Geometronics Section, 1987

YAP ISLANDS
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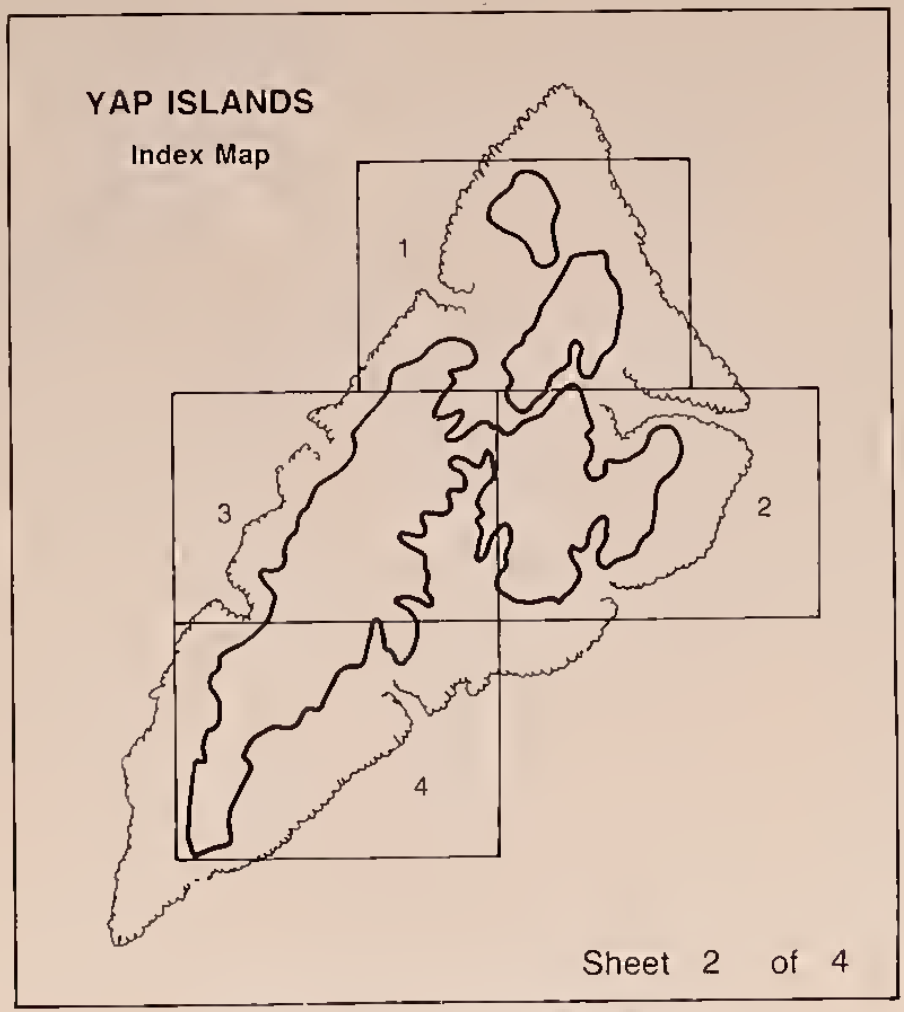

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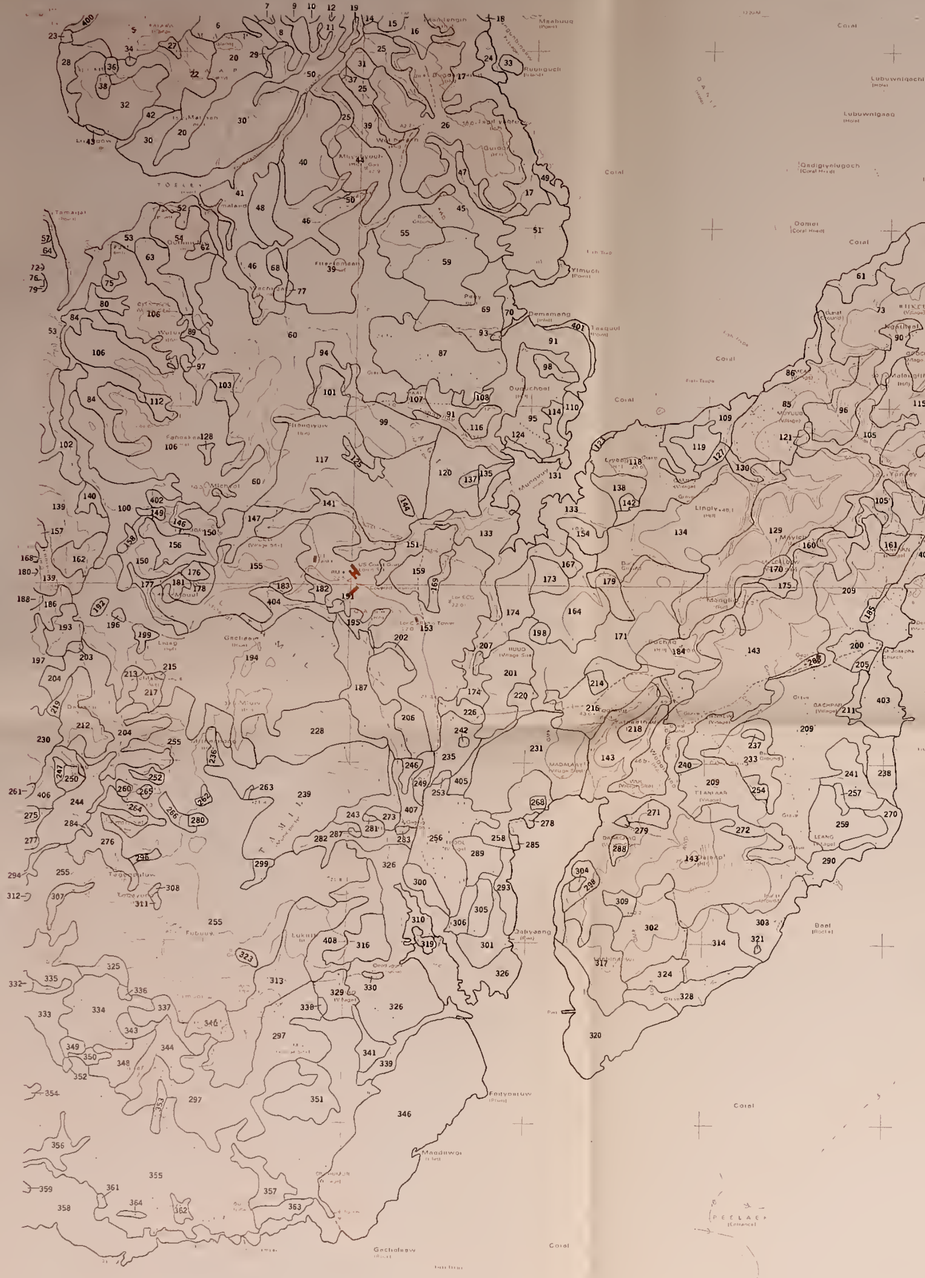


SCALE 1:20,000

Kilometers

Nautical Miles

CONTOUR INTERVAL 5 METERS
DATUM IS MEAN SEA LEVEL

Produced by the United States Geological Survey
in cooperation with Trust Territory of the Pacific Islands
Control by USC&GS and TTPI
Compiled by photogrammetric methods from aerial photographs
taken 1944. 1 and planimetry 1979
Limited field check 1980. Map layout 1981
Township and Range tie(s) relative to 1944
North (1951) (1977) and (1980) (1)
Thin ribbon roads are unverified (1) passage could be poor.
Projection and tick(s) grid value(s) are nonstandard
Modified Transverse Mercator
Hydrography, boundaries, and culture are compiled as of the date
There may be gross omissions or other discrepancies as of
the time shown on these marginal notes shown on this diagram

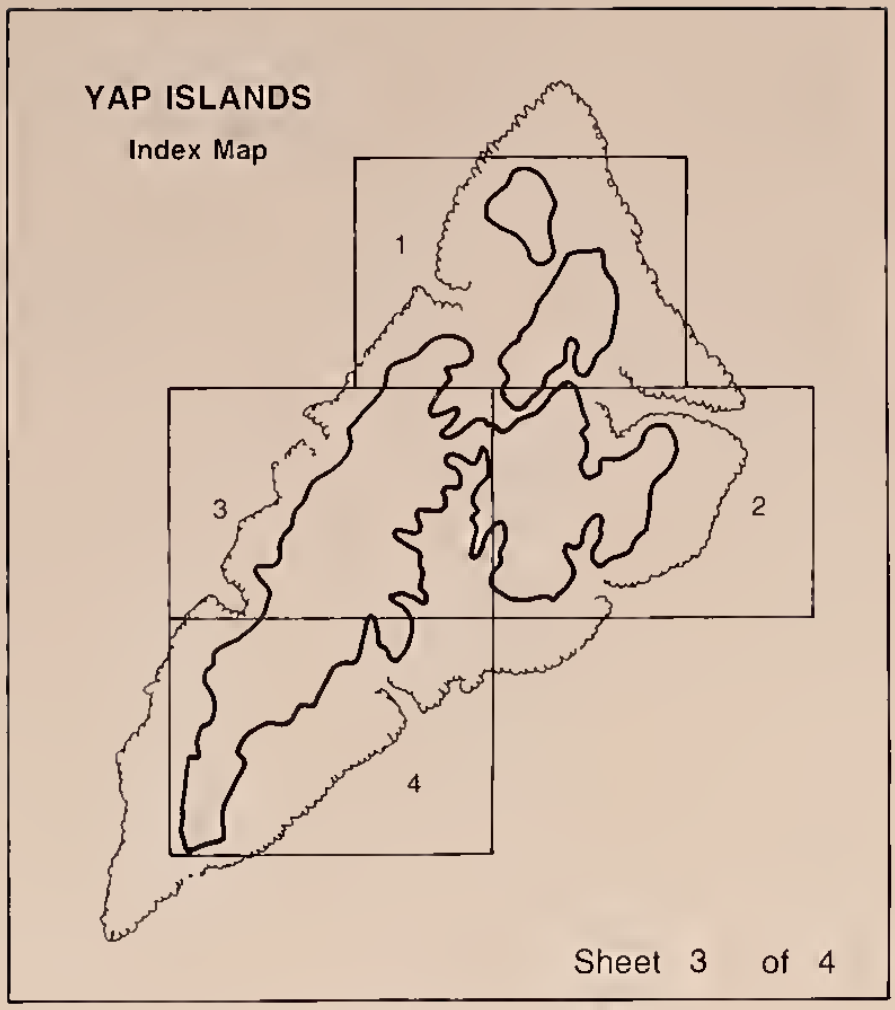
VEGETATION LEGEND

For explanation of vegetation type codes see Table 3.

ITEM	LABEL	AREA (ACRES)	AREA (HECTARES)
5	AG	29	11.7
6	G.GA.F.P	10	4.0
7	M.F	1	.4
8	G.B.F.S	6	2.4
9	G.B.F.S	1	.4
10	G.B.F.S	1	.4
11	MN1H	7	2.8
12	W	1	.4
14	MN0H	1	.4
15	UP1H	3	1.2
16	G.G.S	11	4.5
17	UP1L	48	19.4
18	MN1H	1	.4
19	MN1H	2	.8
20	G.CA.B.F.S	36	14.6
22	AG/SV	30	12.1
23	G.CA.S	1	.4
24	MN1H	6	2.4
25	UP1L	32	12.9
26	G.B	96	38.8
27	M.F	2	.8
28	UP0L	12	4.9
29	SV	2	.8
30	MN1H	74	29.9
31	G.CA.S	4	1.6
32	G.CA.S	37	15.0
33	MN1H	3	1.2
34	G.S	1	.4
36	C	2	.8
37	B	1	.4
38	SV	2	.8
39	G.CA.P.S	74	29.9
40	G.F.P	33	13.4
41	MN1H	36	14.6
42	UP0L	4	1.6
43	MN1H	1	.4
44	G.CA.B.S	25	10.1
45	UP1M	32	12.9
46	UP1H	41	16.6
47	UP0H	7	2.8
48	MN1L	15	6.1
49	MN1H	5	2.0
50	G.P.S	2	.8
51	AG	29	11.7
52	UP1H	7	2.8
53	MN1H	47	19.0
54	G.G	27	10.9
55	AG/SV	24	9.7
56	AG	102	41.3
57	G.F.G	1	.4
58	MN1H	5	2.0
59	AG	32	12.9
60	UP1M	188	76.1
61	MN1H	13	5.3
62	UP2H	3	1.2
63	UP2M	15	6.1
64	UP0L	1	.4
66	MN2H	1	.4
68	MN1L	5	2.0
69	AG/SV.BB	32	12.9
70	MN1H	10	4.0
71	SW1M/SV	15	6.1
72	UP0H	1	.4
73	AG/SV.BB	67	27.1
75	UP0H	2	.8
76	G.F.G	1	.4
77	UP1L	1	.4
78	MN1H	2	.8
79	UP0M	1	.4
80	UP0L	5	2.0
81	MN1H	2	.8
83	MN1H	1	.4
84	UP0M	36	14.6
85	AG	52	21.0
86	MN1H	10	4.0
87	AG	56	22.7
88	AG	4	1.6
90	C	10	4.0
91	UP0L	49	19.8
93	MN1H.S	1	.4
94	G.CA.G.S	8	3.2
95	G.B.F.G.S	30	12.1
96	U/SV	25	10.1
97	UP1L	1	.4
98	UP0M	4	1.6
99	G.F.P.S	28	11.3
100	M.F	35	14.2
101	G.CA.F.P.S	11	4.5
102	UP0H	15	6.1
103	G.S	6	2.4
105	G.G	37	15.0
106	G.B.F.S	169	68.4
107	G.CA.G.S	7	2.8
108	G.G.S	3	1.2
109	MN1H	22	8.9
110	MN1H	5	2.0
111	G.G	9	3.6
112	UP0L	4	1.6
113	G.G	3	1.2
114	UP0M	5	2.0
115	UP1M/SV	140	56.7
116	G.CA.G	6	2.4
117	G.B.F.P.S	96	38.8
118	AG/SV	44	17.8
119	MN1M	8	3.2
120	G.B	30	12.1
121	SV	1	.4
123	MN1H	1	.4
124	UP0L	2	.8
125	UP0H	4	1.6
127	MN1H.S	3	1.2
128	G.S	1	.4
129	UP2M/SV.BB	96	38.8
130	M.S	5	2.0
131	MN1H	2	.8
133	MN1H	58	23.5
134	UP1M/SV	73	29.5
135	UP1H	4	1.6
137	UP0H	2	.8
138	AG/SW	8	3.2
139	G.F.P.S	42	17.0
140	UP0H	4	1.6
141	UP0L	18	7.3
142	M.F	2	.8
143	UP1M/SV	289	117.0
144	UP0L	2	.8
146	UP0H	3	1.2
147	SV	8	3.2
149	G.S	2	.8
150	G.F	30	12.1
151	UP1L	11	4.5
153	U/B	126	51.0
154	G.F.S	8	3.2
155	G.B.S	58	23.5
156	G.B.F.S	11	4.5
157	UP1L	2	.8
158	G.S	2	.8
159	G.B.F.S	19	7.7
160	G.CA.B	5	2.0
161	M.F	4	1.6
162	UP1H	11	4.5
164	UP2M/SV	31	12.5
167	G.F.S	6	2.4
168	UP1L	1	.4
169	UP0L	5	2.0
170	UP2M/SV.BB	6	2.4
171	UP1L	74	29.9
173	UP1M/SV	8	3.2
174	SW2M/SV	28	11.3
175	G.CA.S	4	1.6
176	G.B.F.S	3	1.2
177	UP0M	8	3.2
178	G.B	7	2.8
179	SV	8	3.2
180	UP1L	1	.4
181	G.B.F.S	3	1.2
182	SV	3	1.2
183	G.B	2	.8
184	G.CA.B	47	19.0
185	M.F	3	1.2
186	G.CA.S	7	2.8
187	M.F	53	21.4
188	UP1L	1	.4
191	SV	1	.4
192	C	2	.8
193	UP0M	10	4.0
194	G.B	182	73.7
195	G.W	6	2.4
196	C	1	.4
197	UP1M/SV	13	5.3
198	AG	3	1.2
199	UP0M	3	1.2
200	U/AG	8	3.2
201	UP2M	26	10.5
202	SV	3	1.2
203	G.B.G	1	.4
204	UP1L	47	19.0
205	AG	3	1.2
206	G.CA.B	23	9.3
207	M.F	1	.4
208	U/C	3	1.2
209	AG.CO	172	69.6
211	UP1L	5	2.0
212	G.F	20	8.1
213	UP0H	5	2.0
214	B	3	1.2
215	UP0M	1	.4
216	G.P	33	13.4
217	G.F	7	2.8
218	G.F	7	2.8
219	G.S	3	1.2
220	U/AG	5	2.0
226	G.F.S	6	2.4
228	G.B.F	41	16.6
230	UP1L	13	5.3
231	UP1M/SV.BB	61	24.7
233	SV.BB	22	8.9
235	G.CA.B	16	6.5
236	G.F	3	1.2
237	M.F	1	.4
238	MN1H	15	6.1
239	G.W	87	35.2
240	AG	3	1.2
241	M.F	17	6.9
242	UP0H	1	.4
243	G.F	12	4.9
244	MN1H	23	9.3
246	M.F.C	3	1.2
247	C	2	.8
249	C	3	1.2
250	G.G	3	1.2
252	G.B	2	.8
253	U/AG	1	.4
254	G.CA	3	1.2
255	G.B.F	356	144.1
256	AG.CO	41	16.6
257	SV.BB	2	.8
258	AG	59	23.9
259	SW1M/SV	21	8.5
260	UP0H	2	.8
261	G.C.S	1	.4
262	UP0M	1	.4
263	W	1	.4
264	G.B	9	3.6
265	UP0H	1	.4
266	SV	4	1.6
268	M.F	1	.4
270	AG.CO	9	3.6
271	G.CA	6	2.4
272	UP1M/SV	16	6.5
273	G.CA	4	1.6
275	MN1H	2	.8
276	UP1H	19	7.7
277	W	4	1.6
278	MN1H	1	.4
279	AG	1	.4
280	G.W	2	.8
281	SV	1	.4
282	SV	15	6.1
283	M.F.C	1	.4
284	G.G	1	.4
285	MN1H	1	.4
287	M.F	1	.4
288	G.G	3	1.2
289	UP1M/SV	12	4.9
290	CO1H	10	4.0
293	MN1H	9	3.6
294	UP0M	3	1.2
296	SV	2	.8
297	UP1M/SV	83	33.6
298	G.F.G.S	7	2.8
299	UP0L	3	1.2
300	AG/SV	8	3.2
301	G.S	15	6.1
302	SW1M/SV.H	35	14.2
303	AG	22	8.9
304	UP0L	1	.4
305	C	8	3.2
306	SV	6	2.4
307	UP0M	4	1.6
308	SV	1	.4
309	AG	4	1.6
310	W	6	2.4
311	M.F	1	.4
312	UP0H	1	.4
313	G.CA	57	23.1
314	AG/SV	26	10.5
316	SW1M/SV.BB	15	6.1
317	SW1M/SV.BB	27	10.9
319	MN1H	3	1.2
320	MN1H	47	19.0
321	M.F	1	.4
323	UP0L	2	.8
324	M.F	10	4.0
325	UP2H	6	2.4
326	MN1H	78	31.6
328	AG	18	7.3
329	AG/SV	10	4.0
330	M.F.C	1	.4
332	W	1	.4
333	MN1H	33	13.4
334	AG	32	12.9
335	MN0H	2	.8
336	M.F	1	.4
337	G.CA	11	4.5
338	C	1	.4
339	SW1M	10	4.0
340	U	9	3.6
341	M.F	6	2.4
343	SV	5	2.0
344	U	17	6.9
346	MN1H	146	59.1
348	U/AG	13	5.3
349	AG/SV	3	1.2
350	G.CA	3	1.2
351	AG	20	8.1
352	SW1M	1	.4
353	SV	4	1.6
354	UP2M	2	.8
355	AG.CO	273	110.5
356	M.F.C	9	3.6
357	M.F.C	11	4.5
358	MN1H	57	23.1
359	AG.CO	1	.4
361	M.F.C	1	.4
362	C	3	1.2
363	SW1M	7	2.8
364	M.F.C	1	.4
400	MN1H	5	2.0
401	MN1H	4	1.6
402	G.B.F	6	2.4
403	CO1H	52	21.0
404	UP0L	12	4.9
405	G.B	6	2.4
406	SV	11	4.5
407	SW1M	10	4.0
408	UP0L	23	9.3

Vegetation map compiled by Pacific Southwest Forest and Ranger Experiment Station and Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture. Cartography by Alan H. Ambacher, USDA - Forest Service, Pacific Southwest Region, Engineering Geometronics Section; 1987.

YAP ISLANDS
Sheet 2 of 4



Falanruw, Marjorie C , Whitesell, Craig D , Cole, Thomas G , MacLean, Colin D , Ambacher, Alan H Vegetation survey of Yap, Federated States of Micronesia Resour Bull. PSW-21. Berkeley, CA Pacific Southwest Forest and Range Experiment Station, Forest Service, U S Department of Agriculture, 1987

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SCALE 1:20,000

Kilometers

Nautical Mile

CONTOUR INTERVAL 5 METERS
DATUM IS MEAN SEA LEVEL

Produced by the United States Geological Survey
in cooperation with Trust Territory of the Pacific Islands

VEGETATION LEGEND

For explanation of vegetation type codes see Table 3.

ITEM	LABEL	AREA (ACRES)	(HECTARES)
2	UP1M	127	51.4
3	UP2L/SV BB	11	4.5
4	UP0M	14	5.7
5	G G P S	10	4.0
6	UP2M/SV	43	17.4
7	UP1M/SV BB	11	4.5
8	AG CO	14	5.7
9	UP1M/SV BB	4	1.6
10	G CA G P	7	2.8
11	MN1H	11	4.5
14	CO1H	42	17.0
15	SV BB	13	5.3
16	UP1L/SV	20	8.1
17	SV	35	14.2
19	SW1M/SV	9	3.6
20	SV	16	6.5
21	AG/SV	13	5.3
22	MN1H	57	23.1
23	M F	1	.4
24	G G P S	6	2.4
25	SW1M AG	15	6.1
26	UP2M	73	29.5
27	MN1H	8	3.2
28	SV	13	5.3
29	G S	7	2.8
30	MN1H	2	.8
31	G P S	6	2.4
32	UP1M	12	4.9
33	SV	12	4.9
34	G S	2	.8
35	SV	5	2.0
36	SV	6	2.4
37	G F G	33	13.4
39	AG/SV	4	1.6
42	UP2H	6	2.4
44	UP1M	29	11.7
45	SV	2	.8
46	AG	8	3.2
47	UP2M/SV BB	10	4.0
48	UP1M	60	24.3
49	MN1H	9	3.6
50	UP1M/SV	18	7.3
51	AG/M F C	4	1.6
52	UP2M	24	9.7
53	UP2M	6	2.4
54	UP0H	8	3.2
55	UP2M AG	13	5.3
56	MN1H	5	2.0
57	G F P S	25	10.1
58	UP1M	1	.4
59	G P S	17	6.9
60	G P S	12	4.9
61	AG CO	47	19.0
62	UP0M	4	1.6
63	G F G	16	6.5
64	UP1L	12	4.9
65	SV	9	3.6
66	UP2M	1	.4
67	G S	19	7.7
68	UP2M/SV BB	37	15.0
69	MN1H	70	28.3
70	UP2M	11	4.5
71	M F C	3	1.2
72	G B F	55	22.3
73	AG/SV	6	2.4
74	MN1H	11	4.5
75	UP0L	1	.4
76	UP2M	24	9.7
77	AG	2	.8
78	UP2M/SV BB	71	28.7
79	AG CO	21	8.5
80	MN1H	7	2.8
81	G F	13	5.3
83	UP1M	14	5.7
84	G G S	14	5.7
85	UP2M/SV	90	36.4
86	MN1H	26	10.5
87	UP1M	10	4.0
88	UP1M	20	8.1
89	MN1H	24	9.7
91	G B	58	23.5
92	SV	2	.8
94	SV	5	2.0
95	G S	5	2.0
96	UP1M	58	23.5
97	UP1L/SV	50	20.2
98	G B F P S	16	6.5
99	SV	6	2.4
100	UP1L	149	60.3
102	SV	5	2.0
103	AG CO	24	9.7
104	UP1M	28	11.3
105	UP0H	15	6.1
106	G B F S	39	15.8
107	G CA G	1	.4
108	SV	8	3.2
111	UP1L	3	1.2
112	UP0M	82	33.2
113	G G	1	.4
114	UP1L	37	15.0
115	MN1M	2	.8
116	SV	1	.4
118	SV	48	19.4
119	SV	5	2.0
120	G G	1	.4
121	MN1H	34	13.8
122	G F	3	1.2
124	G G	1	.4
126	G S	26	10.5
127	UP2M	8	3.2
128	AG CO	14	5.7
130	U	7	2.8
132	MN2H	46	18.6
136	MN1H	6	2.4
137	G F S	25	10.1
138	UP1L	8	3.2
139	MN1L	1	.4
140	UP1L	5	2.0
141	UP2M	488	197.5
142	G F P S	14	5.7
144	UP1H	1	.4
145	MN1H	42	17.0
146	MN1H	13	5.3
147	M F	1	.4
148	SV	1	.4
150	SV	3	1.2
151	G CA	10	4.0
152	SV	1	.4
153	UP2L	10	4.0
154	AG	6	2.4
155	M F	1	.4
156	UP0M	1	.4
157	UP2L/SV BB	12	4.9
160	G P	7	2.8
161	SW1M	3	1.2
162	G G	1	.4
163	UP1L	42	17.0
164	SV	2	.8
165	G S	3	1.2
166	UP0L	15	6.1
167	UP1M/SV	32	12.9

ITEM	LABEL	AREA (ACRES)	(HECTARES)
168	UP1L/SV	15	6.1
169	U	1	.4
170	G S	2	.8
171	G CA	32	12.9
172	U	7	2.8
173	G F P S	1	.4
174	SV	13	5.3
175	G G	1	.4
176	MN1H	69	27.9
178	AG CO	13	5.3
179	AG	62	25.1
180	AG/SV BB	41	16.6
181	UP2L/SV	31	12.5
182	G S	3	1.2
183	MN1H N	2	.8
184	UP2L/SV	152	61.5
185	MN1H N	1	.4
186	AG CO	43	17.4
187	G G	1	.4
188	G S	2	.8
189	M S	9	3.6
191	G F P S	1	.4
192	MN1H	4	1.6
193	M F C	1	.4
194	G P	19	7.7
195	G G	1	.4
196	UP1L	6	2.4
198	U	2	.8
199	UP1M/SV BB	17	6.9
200	UP1M	11	4.5
201	U/AG CO	44	17.8
202	G F S	5	2.0
203	U/AG	10	4.0
204	UP1M	14	5.7
205	G CA	2	.8
206	M F	2	.8
207	AG	8	3.2
208	SV	11	4.5
209	C	1	.4
210	MN1H	6	2.4
211	G G	1	.4
212	B	2	.8
213	W	7	2.8
215	UP0L	7	2.8
216	SV BB	41	16.6
217	AG	35	14.2
218	G B	17	6.9
219	SV H	8	3.2
220	M F	1	.4
221	AG CO	59	23.9
222	G CA	3	1.2
223	AG CO	16	6.5
224	MN1H	10	4.0
225	UP2M/SV BB	133	53.8
226	UP1L/SV	98	39.7
227	UP0M	4	1.6
228	MN1H	25	10.1
229	UP1M/SV	17	6.9
230	UP1M/SV	9	3.6
231	MN1H	19	7.7
234	C	2	.8
235	AG	6	2.4
236	M F C	1	.4
237	UP0L	2	.8
238	MN2H	37	15.0
239	MN1H	93	37.6
240	M F	1	.4
241	SV	1	.4
242	G G	2	.8
244	MN1H	1	.4
245	MN1H	1	.4
247	G B	30	12.1
248	C	2	.8
249	U/C	6	2.4
250	UP1M/SV BB	110	44.5
251	UP1H	16	6.5
252	MN1H	2	.8
254	SV	10	4.0
255	UP0M	8	3.2
256	M F C	1	.4
257	UP1L	5	2.0
258	UP1M	12	4.9
259	SV	2	.8
260	G S	50	20.2
261	UP1M/SV BB	4	1.6
262	MN1H	5	2.0
264	AG	3	1.2
265	SV BB	13	5.3
266	M F C	1	.4
267	MN1H	6	2.4
268	SV BB	11	4.5
269	UP0M	33	13.4
270	G CA B	14	5.7
271	G P S	11	4.5
272	AG/SV	81	32.8
273	M S	1	.4
275	SV	8	3.2
276	G B S	9	3.6
277	UP1M	124	50.2
278	UP0H	1	.4
279	M F C	2	.8
280	UP2M	50	20.2
281	UP1M/SV	104	42.1
282	G G S	1	.4
283	SV	1	.4
284	UP2M	25	10.1
285	G G	44	17.8
287	G B G	21	8.5
288	MN1H	5	2.0
289	UP1H	2	.8
290	MN1H	2	.8
291	AG	13	5.3
292	UP0L	28	11.3
293	UP1M/SV	11	4.5
294	MN2M	16	6.5
295	M F C	3	1.2
296	U	126	51.0
297	G B G	4	1.6
298	SV	2	.8
299	M F C	1	.4
300	G F S	5	2.0
301	UP1L	10	4.0
302	MN1H	1	.4
303	UP2M	82	33.2
304	UP1M/SV BB	100	40.5
305	UP1M/SV	167	67.6
307	UP2M/SV	7	2.8
308	UP0M	5	2.0
309	SV	3	1.2
311	AG/SV	3	1.2
312	G B F	1	.4
313	MN0H	3	1.2
315	G B F	3	1.2
316	MN1H	2	.8
317	MN1H	4	1.6
318	G P	129	52.2
319	UP1M	35	14.2
320	MN1H	6	2.4
321	U	1	.4

ITEM	LABEL	AREA (ACRES)	(HECTARES)
322	G CA	13	5.3
323	SV	6	2.4
324	G F S	46	18.6
325	G F S	14	5.7
326	G S	4	1.6
327	G S	8	3.2
329	G F S	30	12.1
330	UP1M	3	1.2
331	UP2M/SV	10	4.0
332	UP1M/SV	29	11.7
333	MN1H	31	12.5
334	C	5	2.0
335	AG/SV BB	36	14.6
337	UP2M/SV	62	25.1
338	MN1H	5	2.0
339	UP1M/SV	45	18.2
341	M F C	1	.4
342	AG CO	56	22.7
343	G S	12	4.9
344	AG CO	219	88.6
345	UP1M/SV BB	11	4.5
346	UP1M	61	24.7
347	MN1H	1	.4
348	SV	30	12.1
349	AG	27	10.9
350	U/C	3	1.2
351	MN1H	3	1.2
352	AG CO	9	3.6
353	U	10	4.0
354	UP1M/SV	4	1.6
356	AG	5	2.0
357	UP1M AG	35	14.2
358	UP2M/SV	144	58.3
359	UP1M	43	17.4
360	UP2L/SV BB	6	2.4
362	UP1M/SV	9	3.6
363	MN1H	3	1.2
364	G P S	244	98.7
365	UP1M/SV BB	20	8.1
366	SV	2	.8
367	M F C	1	.4
370	UP1M	1	.4
371	M F C	1	.4
372	M F C	1	.4
373	MN1L	1	.4
374	C	1	.4
375	G P	29	11.7
376	W	1	.4
377	SV	4	1.6
378	AG	1	.4
379	MN1L	3	1.2
380	AG	36	14.6
381	AG/SV	29	11.7
383	G CA	1	.4
384	MN1L	1	.4
386	MN1M	5	2.0
387	MN1H	3	1.2
388	M F C	1	.4
389	MN1H	15	6.1
390	MN1H	9	3.6
391	AG	17	6.9
392	SV	7	2.8
393	AG/SV	3	1.2
394	MN1H	14	5.7
396	MN1H	2	.8
397	SV	10	4.0
400	M F C	1	.4
401	G S	5	2.0
402	W	4	1.6
403	B	6	2.4
405	MN1H	1	.4
406	SV	5	2.0
407	G CA	11	4.5
408	MN1H	1	.4
409	SV	2	.8
410	U	37	15.0
411	W	38	15.4
413	AG	49	19.8
414	MN1H	15	6.1
415	SV	101	40.9
416	UP1M/SV	12	4.9
418	MN1H	39	15.8
419	UP1M/SV	7	2.8
422	U	4	1.6
423	SV	10	4.0
424	G CA	5	2.0
425	SV	4	1.6
426	U	1	.4
429	M F C	1	.4
431	SV	6	2.4
433	C	2	.8
434	AG	12	4.9
435	U	15	6.1
437	M F C	1	.4
439	UP1M/SV	7	2.8
441	G P S	5	2.0
442	SV	4	1.6
443	UP1L/SV BB	17	6.9
444	M F C	1	.4
445	AG CO	11	4.5
447	AG/SV	18	7.3
448	AG/SV	46	18.6
449	U/SV	6	2.4
450	G CA	3	1.2
451	G CA P	30	12.1
452	G CA P	12	4.9
453	AG	26	10.5
454	G S	4	1.6
455	UP1H	2	.8
456	SW1M/SV	30	12.1
457	UP1M/SV	6	2.4
458	G G S	21	8.5
459	MN1H	4	1.6
460	SV	4	1.6
462	C	3	1.2
463	SV	5	2.0
465	W	11	4.5
466	SV	4	1.6
468	SV	19	7.7
469	MN1H	4	1.6
470	MN1H	2	.8
471	SV	2	.8
472	AG CO/M F C	18	7.3
473	AG/SV	6	2.4
474	U/C	5	2.0
475	G CA	4	1.6
476	UP1M/SV	6	2.4
477	AG CO/M F C	7	2.8
478	G F S	4	1.6
479	G S	1	.4
480	G S	1	.4
500	G P S	10	4.0
501	AG	1	.4
502	G B F S	32	12.9
503	MN1H	3	1.2
504	UP0H	1	.4
505	MN1H	14	5.7
506	SW2M/SV BB	71	28.7
507	UP1H	10	4.0
508	MN1H	1	.4
509	MN1H	2	.8
510	G P S	27	10.9
511	G D P	37	15.0
512	SV	1	.4
513	U/AG	6	2.4
514	G S	10	4.0
515	SV	6	2.4
516	UP1L/SV	3	1.2

Vegetation map compiled by Pacific Southwest Forest and Range Experiment Station and Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture. Cartography by Alan H. Ambacher, USDA - Forest Service, Pacific Southwest Region, Engineering Geometronics Section: 1987.

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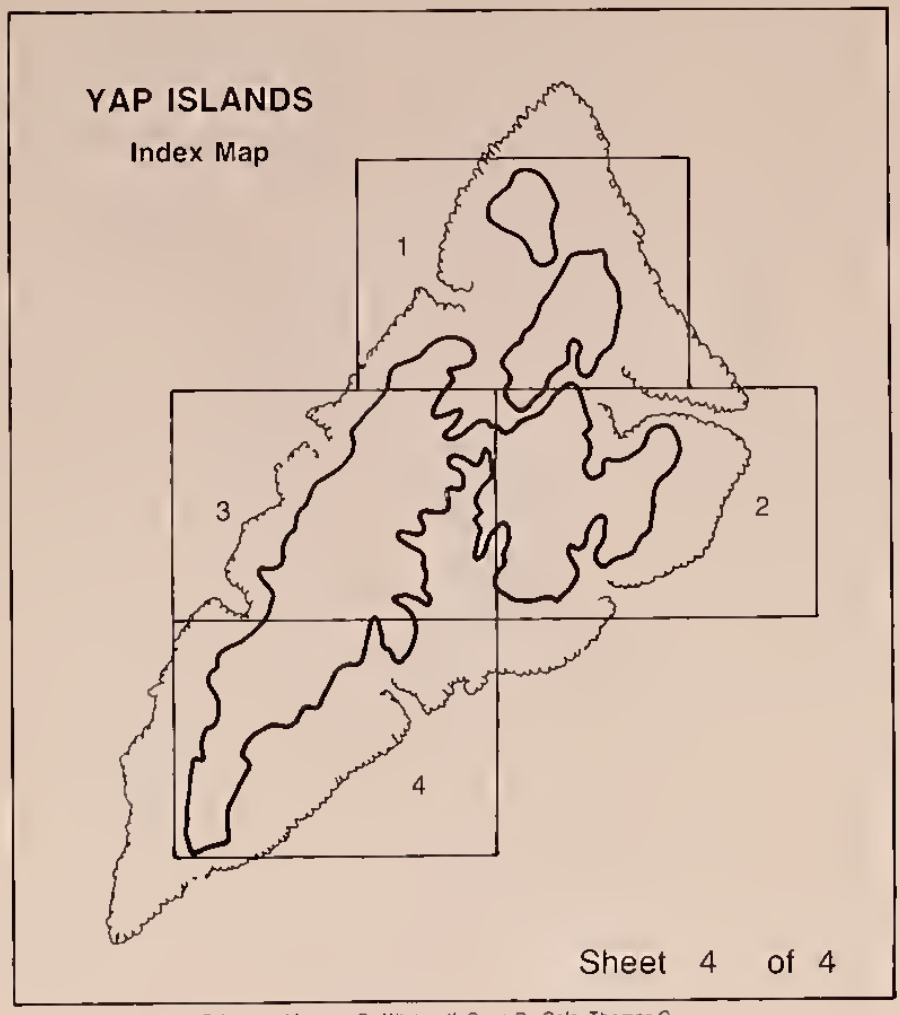

Falanruw, Marjorie C., Whitesell, Craig D., Cole, Thomas G., MacLean, Colin D., Ambacher, Alan H. Vegetation survey of Yap, Federated States of Micronesia. Resour. Bull. PSW-21. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; 1987

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Produced by the United States Geological Survey
in cooperation with Trust Territory of the Pacific Islands

SCALE 1:20,000

Kilometers

Nautical Mile

CONTOUR INTERVAL 5 METERS
DATUM IS MEAN SEA LEVEL

VEGETATION LEGEND

For explanation of vegetation type codes see Table 3

ITEM	LABEL	AREA (ACRES)	AREA (HECTARES)	ITEM	LABEL	AREA (ACRES)	AREA (HECTARES)
3	G.P.S	35	14 2	138	SV	52	21.0
4	AG/SV	10	4 0	139	AG/SV	33	13.4
5	MN1H	1	4	140	MN1H	1	4
7	SW1M/SV	6	2.4	141	MN1H	2	8
8	G.S	3	1 2	142	G.G	7	2 8
9	AG/SV	11	4 5	143	SV	21	8.5
11	U	9	3 6	144	M F	11	4 5
13	MN1H	29	11 7	145	MN1M N	5	2.0
14	UP2M/SV	1	4	146	MN1H	3	1 2
15	UP1M/SV BB	22	8.9	147	UP1M/SV	50	20.2
16	UP2M/SV	1	4	148	MN1H	79	32.0
17	SV	189	76 5	150	M F	2	8
18	G P S	47	19.0	151	AG/SV	7	2.8
19	UP1M/SV	19	7 7	152	AG/SV	36	14.6
20	W	2	.8	154	M.F C	3	1 2
21	SV	1	4	155	AG	34	13.8
22	AG	37	15 0	156	M F	5	2.0
23	UP1M/SV	13	5.3	157	MN0H	11	4 5
24	UP0M	7	2.8	158	U/C	24	9 7
25	SV	9	3.6	159	MN1H	23	9 3
26	U	5	2.0	160	M F	13	5.3
27	G.W	57	23.1	162	AG CO	4	1.6
28	M.F C	8	3.2	165	AG.CO	5	2 0
30	G G	6	2.4	166	SW1M/SV	4	1 6
31	G.P S	76	30.8	167	AG/SV BB	65	26.3
32	MN1H	5	2 0	168	AG CO	61	24 7
33	SW1M/SV	14	5.7	170	M.F	2	8
34	U	15	6.1	171	B	3	1 2
35	MN1H	1	4	172	MN0H	4	1 6
36	AG.CO/M.F.C	281	113 7	175	AG/SV	51	20 6
37	SV	6	2.4	176	CO1H	33	13.4
38	M F.C	2	.8	177	M F	8	3 2
39	AG	19	7 7	179	B	1	4
40	MN1H	9	3.6	180	B	1	4
41	G.CA	5	2.0	181	MN1H	17	6 9
42	MN1H	1	.4	182	MN1H	47	19 0
43	G.G	1	.4	183	B	1	4
44	M.F.C	1	4	184	CO1H	50	20.2
45	MN1H	1	4	185	SV.BB	31	12 5
46	AG/SV.BB	44	17.8	186	MN1H	1	4
47	SV	6	2 4	187	M F	11	4 5
48	MN1H	1	4	189	M F C	2	.8
50	U/AG	9	3.6	190	SV	7	2 8
51	MN1H	1	.4	191	MN1H	4	1.6
52	MN1H	3	1.2	192	SV.BB	61	24.7
53	AG	7	2.8	193	G CA	13	5 3
54	SW1M/SV	5	2 0	194	M.F	6	2 4
55	C	6	2.4	195	AG/SV	22	8 9
56	MN1H	2	.8	197	M.F	5	2.0
57	G.P.S	11	4.5	198	CO1H	27	10.9
58	G.S	24	9.7	199	U	1	.4
59	C	1	.4	200	SV	2	.8
60	UP1M/SV	13	5.3	201	M.F	9	3.6
61	M.F.C	1	.4	202	AG/SV	29	11.7
62	UP1M/SV	5	2.0	203	SV.BB	3	1.2
63	B	1	.4	204	AG	65	26.3
64	G.P.S	14	5.7	206	SV	6	2 4
66	M.F	1	4	207	MN0H	1	4
67	AG	76	30.8	208	MN0H	1	4
68	MN1H	19	7.7	209	U/C	9	3.6
69	U	5	2.0	210	M.F	7	2.8
70	U	14	5 7	211	MN1H	4	1.6
71	MN1H	8	3.2	212	CO1H	46	18 6
72	UP1M.AG	42	17 0	213	AG	1	4
73	MN1H	35	14 2	214	MN0H	1	4
74	MN1H	6	2.4	215	MN0H	3	1.2
75	G.CA	13	5.3	216	MN1H	12	4.9
76	AG	1	.4	217	SV	9	3 6
77	G.CA	9	3.6	218	MN0H	6	2 4
78	G.CA	36	14.6	220	M.F	17	6.9
79	AG/SV.BB	99	40.1	221	M.F C	1	4
80	G.S	13	5.3	222	MN0H	4	1.6
81	G.CA	64	25.9	223	G.B	2	.8
82	CO1H	3	1.2	224	SV BB	74	29 9
83	M.F.C	1	.4	225	MN0H	1	4
84	AG CO/M.F.C	2	.8	227	SW1L	7	2.8
86	AG/SV	12	4 9	228	AG	18	7 3
87	MN1H	1	4	229	M F	7	2 8
88	MN1M	333	134.8	230	U	8	3.2
90	U/SV	2	.8	231	U	2	.8
91	U/SV	15	6.1	232	SV	11	4 5
92	SV	1	4	233	AG	13	5.3
93	W	1	4	234	M.F.C	2	.8
94	M.F	4	1.6	235	MN1	6	2.4
95	AG.CO	70	28.3	236	SV	27	10.9
96	M.F	9	3.6	237	AG.CO/M.F C	246	99 6
97	AG	57	23.1	238	MN1H	4	1 6
98	SV	12	4.9	239	U	9	3.6
100	G.CA.F	7	2.8	241	M F	17	6.9
102	G W.D	6	2.4	242	AG/SV	43	17 4
103	SV	6	2.4	243	M.F	1	4
104	G B.F	67	27.1	244	U/SV	9	3 6
105	M.F	1	.4	246	G.CA	3	1 2
106	G.CA	34	13.8	247	AG	22	8 9
107	AG/SV	46	18.6	248	MN1H	1	.4
108	MN1H	4	1 6	249	U	4	1.6
109	G.B	7	2.8	250	M F	1	4
110	G.W D	18	7.3	252	M.F	2	8
111	AG	8	3.2	254	U	4	1.6
114	G B.F	25	10 1	255	MN0H	1	.4
115	G.W	26	10.5	256	AG	2	.8
116	UP2M/SV	4	1.6	257	MN1H	18	7 3
117	MN1H	24	9.7	258	MN1H	2	.8
118	U	17	6.9	259	MN1H	2	.8
119	M.F	3	1 2	260	MN1H	1	4
120	SV	30	12.1	301	G P.S	9	3.6
121	MN1H	26	10.5	302	G P S	2	.8
122	G.CA	16	6 5	303	UP1M/SV	13	5 3
123	SV	6	2 4	304	UP1M/SV	1	4
124	G.CA.S	9	3 6	305	AG.CO	4	1 6
125	SV	2	.8	306	G.P.S	5	2 0
126	AG/SV	6	2.4	307	G.P.S	9	3 6
127	MN0M	1	.4	308	G P.S	1	.4
128	M.F	25	10.1	309	UP1M/SV	1	.4
129	U/B	62	25.1	310	G.P S	1	.4
130	UP1M/SV	29	11.7	311	G.P.S	15	6 1
131	MN1H	3	1.2	312	G.CA	37	15 0
132	MN1H	1	.4	313	AG	11	4 5
133	W	6	2.4	314	MN0H	5	2.0
134	AG.CO	117	47.3	315	AG/SV	10	4 0
135	G.W	1	.4	316	SV.BB	1	4
136	G.B.F	12	4.9	317	G.B.G	304	123.0
137	M.F	2	8	318	U/B	27	10.9

Vegetation map compiled by Pacific Southwest Forest and Range Experiment Station and Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture. Cartography by Alan H. Ambacher, USDA - Forest Service, Pacific Southwest Region, Engineering Geometronics Section; 1987.

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Sheet 4 of 4

Falanruw, Marjorie C.; Whitesell, Craig D.; Cole, Thomas G.; MacLean, Colin D.; Ambacher, Alan H. **Vegetation survey of Yap, Federated States of Micronesia.** Resour. Bull. PSW-21. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; 1987. 9 p. + 4 maps.

The vegetation of Yap, Federated States of Micronesia, in the western Caroline Islands was mapped for land-use planning, forest resource management, and timber volume surveys. The maps show the location and extent of vegetation types identified from 1976 aerial photographs. Forest area is estimated at 3,882 ha (9,593 acres), with an additional 553 ha (1,366 acres) in secondary vegetation. Twenty-six percent (2,538 ha or 6,272 acres) of the island is used for agroforestry.

Retrieval Terms: vegetation survey, vegetation maps, forest resources, Yap, Federated States of Micronesia, Caroline Islands, Micronesia